# Botanical Gazette.

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EDITORIAL.—DR. GEO. THURBER, the distinguished botanist, so well known from his work in the *Gramineæ*, sailed for Europe Sept. 2nd. We understand his object is a study of the various Experimental Stations in France, Germany and England, in the interest of progressive agriculture.

FERNS OF NORTH AMERICA.—Since the issue of the last part (No. 27) of Prof. Eaton's great work, bearing the above title, several species have been discovered, either entirely new, or new to this country, and a considerably larger number are likely to be found in the future. Many of the subscribers have urged the publisher, Mr. S. E. Cassino, to issue new parts from time to time as new species are discovered; these supplementary parts in time to constitute Vol. 3. This will be done if a sufficient number of subscribers agree to to continue. The price and style of the work will remain unchanged. Probably not more than from 2 to 4 parts will be issued per year. Those wishing to aid in keeping this great work abreast of the times should send their names immediately to the publisher, S. E. Cassino, 299 Washington St., Boston, Mass.

A LETTER FROM BARON EGGERS informs us "that the first set of 100 species of dried West Indian plants is now ready for distribution, as are also sets of fruits and seeds, and of woods (cross sections of stems 10 centim. long) and arboreous vines. The following very low prices have been fixed, and we take pleasure in making them known to our subscribers:

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| 100 dried plants, | $8.00. |
| 100 species fruits and seeds, | 7.00. |
| 100 species woods, | 16.00. |
| 50 species arboreous vines, | 16.00. |

Of the arboreous vines, each species is represented by 10 pieces of the stem, 25 centim. long, of various thicknesses. Transportation is prepaid. Subscriptions for any of the above sets will be received by the Curator of the Botanical Museum at Harvard University, Cambridge, Mass., who will also see the collections properly forwarded.

HORTICULTURIST'S NAMES sometimes grow to as great a length as the good old names given to plants before the system of binomial nomenclature came into use. The latest addition to ornamental trees is *Acer Plantanoides Aurea variegatum Buntzleri*, or, in other words, a striped leaf maple.

PROF. MARCUS E. JONES, Grinnell, Iowa, has had the good fortune of having quite a lengthy paper (64 pp.) translated into French

and published by no less an association than the Federation of Horticultural Societies of Belgium. It is entitled "Une Excursion Botanique au Colorado et dans le Far West" and is translated by Dr. Henri Fonsny, of Verviers. Prof. Jones is collecting largely in the west and enough of his specimens have reached Europe to make him known there, and the desire to know more of the country that produces such plants has led to the writing of this paper.

THE IOWA ACADEMY OF SCIENCES has published a pamphlet of some 30 pages containing its procedings from August 1875, the date of organization, to July 1880. The number of Fellows cannot exceed 30, and only such persons as have done good scientific work are eligible, the assent of three-fourths of the members being necessary to a choice. From the list of Fellows given we note but two to whom some branch of botany is credited as a specialty, namely, Prof. C. E. Bessey and Dr. C. M Hobby The latter gentleman publishes a list of the "Fresh Water Algæ found in Iowa" Twenty-seven genera are represented by seventy two species, *Spirogyra* containing eighteen.

THE STEM OF PUMPKIN FOR ILLUSTRATING PLANT HISTOLOGY.—The stem of the common pumpkin (*Cucurbita Pepo*) is admirably adapted for use in the laboratory to illustrate many kinds of cell-structures, and the larger part of the tissues of the higher plants. It is of a convenient size to be held for sectioning, and after remaining in a sufficient quantity of strong alcohol for awhile becomes very solid, so that exceedingly thin sections are easily obtained. The cells are comparatively large and a power of 250 to 500 diameters will demonstrate almost every detail.

A cross-section of the stem shows without magnification five small fibro-vascular bundles lying beneath the five angles of the stem, with the same number of much larger bundles situated between them, but deeper These are imbedded in the fundamental tissue, and the whole surrounded by a cortical rind. The center of the stem is hollow, due to rupture of the fundamental tissue from expansion by growth. Other features of the stem can be made out without a microscope, but it is best to revert to them after their full significance is understood.

An enumeration of the kinds of cells and tissues to be met with will answer the purpose of this notice, as no extended description is intended. The cortical rind is composed of epidermis and hypoderma. Three forms of cells belong to the epidermal system—simple epidermis cells, hairs, and guard-cells of the stomata, the latter best studied in cross sections of the stem. The fundamental system comprises the large-celled, thin walled parenchyma in which the fibro-vascular bundles lie, and the hypodermal tissues. The parenchyma is colorless and varies little except in size of the cells. The hypoderma consists of two layers, encircling the stem, partly performing the office of imparting strength, and partly containing assimilative protoplasm. The innermost of these is of uniform thickness and made up of slender wood cells. Thin transverse septa are occasionally met with, which

are usually regarded as subsequent formations,* but may, however, be the persistent partitions of cells that generally coalesce completely to form single wood-cells.† The wall of the cells is differentiated into three lamellæ—a middle one, with one on either side—and has simple pits not penetrating the middle lamella. These pits are twisted in such a way that they have the appearance of being situated at the intersection of the arms of an oblique cross, when seen in front view. To determine their structure requires careful examination with a high power. Between the wood-ring and the epidermis lies a ring of tissues of very considerable importance, but not homogeneous like the last. It consists of parenchyma containing chlorophyll, in which lie numerous masses of collenchyma in contact with the epidermis but not extending quite deep enough to come in contact with the cortical wood. The stomata are all situated in the part of the epidermis touched by the chlorophyll bearing parenchyma, which is readily distinguished upon the exterior of the stem as interrupted lines of darker green.

The fibro-vascular bundles are open, two-sided bundles, but peculiar in having an additional phloem portion on the axial side. The xylem and the outer phloem are separated by the cambium, in which the progressive transformation from simple uniform cells to the various mature cells of each portion can be traced. Both the axial and outer phloem consist of sieve-tubes, interspersed with long, slender parenchyma cells, the two together forming "soft bast." These are excellent examples of sieve-tubes: the perforated end-partitions, the broad thin spots and sieve plates of the side walls, and the conspicuous protoplasmic contents are readily made out in detail. The xylem contains all gradations between the extreme form of annular vessels with widely isolated rings, on the one hand, through spiral, reticulated, scalariform, to pitted vessels, on the other hand. The structure of the walls of these vessels can only be studied satisfactorily under high powers. Between and about the vessels is wood-parenchyma.

To sum up the tissues of the stem of *Cucurbita*:

- Epidermal system:
  - Epidermis.
  - Stomata.
  - Hairs.
- Fundamental system:
  - Interfascicular parenchyma.
  - Hypoderma.
    - Cortical wood.
    - Cortical parenchyma.
    - Collenchyma.
- Fibro-vascular system:
  - (Cambium).
  - Phloem.
    - Sieve-tubes.
    - Phloem parenchyma.
  - Xylem.
    - Vessels.
      - Annular.
      - Spiral.
      - Reticulated.
      - Scalariform.
      - Pitted.
    - Wood parenchyma.

To these should doubtless be added laticiferous tissue sometimes

*Sachs, Text-book, p. 101.
†Bessey, Botany, p. 74.

detected in the phloem. It will be observed we have illustrations here of the three tissue systems; of all the principal sorts of tissues, except sclerenchyma. i. e., parenchymatous, fibrous, laticiferous, sieve, and tracheary tissues; with several well marked varieties of the first and second. The only prominent varieties not included are cork, bast, and tracheides, modifications respectively of parenchymatous, fibrous, and tracheary tissues. It would probably be difficult to select any one common example that more admirably illustrates tissues and tissue elements, and, withal, so simply constructed for histological study.—J. C. ARTHUR, *University of Wisconsin.*

HABENARIA GARBERI, n. sp.—Stem erect, a foot or more high, bearing at the base 1 to 2 globular tubers ½ to 1 inch in diameter, leafy; leaves oblong-lanceolate; spikes 3 to 6 inches long, loosely or densely flowered; bracts lanceolate, acuminate, about as long as the ovary; flowers greenish-yellow; exterior perigonial divisions broadly ovate, the lateral ones concave and reflexed; the two interior ones erect and 2-parted, the anterior division involute-filiform and truncate, the longer posterior one cuneate; lips larger than the perigone, entire, linear from a broad base, obtuse; spur filiform, equalling or exceeding the ovary in length, 6–9 lines.

Collected in 1878, in wet or damp hummocks, around Manatee, S. Florida, by that indefatigable and zealous botanist, Dr. A. P. Garber, for whom it is named. It blooms in the fall or winter. The flowers exhale a pleasant, verbena-like odor. It is No. 315 of Dr. G.'s. Florida collections.—THOS. C. PORTER.

NOTES FROM PROVIDENCE, R. I.—In a recent visit to Narragansett Pier, R. I., I found the species *Solidago lanceolata*, L. and *S. tenuifolia*, Pursh thronged with the lovely moth *Deiopeia bella*. One could easily have collected enough to supply exchanges for years. It was not to be seen about *S. sempervirens* which grew not far off.

I have noticed a restricted limitation of *Aster Novæ Angliæ*, L. It is not found in the immediate vicinity of our city, but about six miles north becomes very abundant on the *road-sides* and continues so in a belt to the west. One as suddenly passes out of its range. I think it grows best in the limestone region about here, where it is truly magnificent.

Mr. J. L. Bennett reports *Ambrosia trifida* L. as having appeared in our city. It is curious that it has not done so before, as at Hartford, ninety miles away, it is very common and might have been expected to follow the railway. But then while *Cichorium Intybus* is a nuisance about Boston, it is very infrequent here; its nearest approach, in quantity, is, perhaps, at Canton.

Brown University has received from the Trustees of the late Col. Olney $10,000, the income to be used for the increase of his herbarium and botanical library. A further sum of $25,000 is left to the college for a professorship of Natural History, "one of the duties of the professor being to lecture on Botany." This sum is not yet acquired.

Col. Olney undoubtedly had in view a chair similar to that occupied by Prof. Gray, at Harvard, but his wording is unfortunate for the good of our science, or indeed of any other.

The time has gone by when a composite chair of natural science is desirable or even feasible. Another unhappy oversight in the testator was his neglect to provide for the payment of a curator. A large herbarium can easily and profitably occupy a man's whole time. As the increase of the library is the function of the Library Committee, so will be the matter of addition to the herbarium.—W. W. BAILEY.

CURTISS' 4TH FASCICLE OF SOUTHERN PLANTS.—As I am unable to answer inquiries in regard to my next distribution, being absent from home this fall, I beg leave to inform my friends through the GAZETTE that Fascicle IV now in preparation and to be issued next winter, will be uniform in all respects with Fascicle III. I think, however, that the specimens will be more satisfactory, as I have a better supply of materials. My collections of 1879 suffered much from the humidity of the country in which I worked. The wonder is that they were not wholly ruined. This year I have collected mainly on the southern and western coasts of Florida, and have had excellent success. The observations I have made this year will add largely to our previous knowledge of Floridian Botany, extending and defining the range of most plants ascribed to "South Florida," including nearly all of those recently reported by Dr. Chapman through the GAZETTE to which I am now able to add two or three dozen more species, including three Palms and two epidendric Orchids.—A. H. C.

NOTES FROM RACINE, WIS.—Concerning Mr. Cochran's note on *Physalis grandiflora*, Hook, Dr. Lewis Sherman, of Milwaukee, Wis., informs me that he collected the plant in 1874, at Stevens' Point, Wis., which is near the centre of the State, and in about the same latitude as Mr. Cochran's station. I was interested in the articles of Mr. L. H. Bailey, Jr., but missed some plants common on the lake-shore here *Aster angustus*, Torr. and Gray, has been very abundant on and near the beach, but is scarce this season, whether, owing to the mild winter, the wet summer or some other cause, I am unable to say. *Ranunculus Cymbalaria*, L., is a common plant on the beach. *Salix Barclayi*, Anders, *S. amygdaloides*, Anders, *S. longifolia*, Muhl., *S. lucida*, Muhl. and *S. purpurea*, L., are more or less abundant on the beach and sides of the bluffs. The common grass of the the beaches here is *Sporobolus cryptandrus*, Gray. On the wet, clayey sides of a gully in the lake bank, *Triglochin palustre*, L., and *Lobelia Kalmii*, L., are abundant. Fortunately for the root-digger, *Asclepias tuberosa*, L., grows in the sand, but is not very abundant.

The Asclepiads seem to have a tendency toward whorled leaves. Besides the species in which such an arrangement is common, I have collected *A. incarnata*, L., with a whorl of four leaves, and *A. Cornuti*, Decaisne, with leaves in both threes and fours and other specimens with very short internodes.

The length of the peduncle does not seem to be a very reliable character by which to separate *Trillium erectum*, L., var. *declinatum*, Gray and *T. cernuum*, L. The peduncles of the former are sometimes very short, while those of the latter increase in length while the flower matures. The purplish anthers of the latter, with the greater separation of the anther cells and more contracted base of the leaf are the characters I use.

I found last summer a specimen of *Trillium recurvatum*, Beck, with leaves and parts of the flowers in fours. *Barbarea vulgaris*, R. Br., seems to be perennial here.—J. T. DAVIS, M. D.

STIPULES IN ONAGRACEÆ.—Prof. Baillon says (*Bull. mensuel, Soc. Lin. de Paris*, No. 33) that in the majority of works on descriptive botany, this family is mentioned as characterized by the constant absence of stipules, and in justification of this quotes the classical works of Decaisne, Duchartre, Endlicher and Hooker; nevertheless, he states that the existence of these organs in this family admits of easy proof, not indeed that they ever occur of large dimensions, for then they could not have escaped detection, but still they are present, more commonly as little subulate tongue-like bodies, acute, often red-colored at the base of the petioles in both opposite and alternate-leaved plants. In Hanya they soon turn black and wither off early. In the fuchsia of our gardens little stipules are often present. In Circæa they can also be detected. In the Lopezia of our gardens all the leaves have two very distinct stipules, which, indeed, have been often referred to in botanical works, and it is the same with Haloragеæ, though Bentham and Hooker describe them as here absent.—NATURE.

FLORIDIAN FERNS.—Next winter I intend to prepare for the GAZETTE a list of the Ferns of Florida, with the geographical bounds of each species, which my travels in the peninsula will enable me to do pretty accurately. I expect to have ready in December a second set of Southern Ferns, and a second issue of the first set, mostly collected in different localities. I have just prepared a fourth set of Pteris collected in the heart of Charleston City. It was brought to my attention by Prof. Lewis R. Gibbes, of Charleston College, who says he sent specimens to Prof. Eaton, who pronounced it *P. serrulata.* Most of the yards in Charleston are surrounded by massive walls, which, crumbling and deeply shaded, invite the growth of all sorts of Cryptogams, and many Phaenogams. It is many years since Prof. Gibbes first noticed this form, in fact, I think he called my attention to it when there five years ago. I prepared full sets of this and three other Charleston plants, namely, *Stillingia sebifera*, *Alternanthera Achyrantha* and a Verbena, not mentioned by Chapman, a very peculiar "Vervain." I am now on my way to the Southern Alleghanies and mean to search out a peculiar Abies, which Prof. Gibbes has observed there.—A. H. CURTISS.

HERBARIUM TO BE DISPOSED OF.—I learn to my surprise that the Herbarium of the late J. T. Holton, which was carefully boxed up in his lifetime, still remains on the hands of his widow and children. It was long ago understood that his college classmates were to purchase it for four or five hundred dollars, and present it to their alma mater, Amherst College. This has not been done, and the collection could now be had by any botanist at a low price. The herbarium is mainly North American, but contains the full set of the collection which Mr. Holton made in the interior of New Grenada, a great number of *Ericeæ* collected and named by Drege at the Cape of Good Hope, etc. The number of species, according to Mr. Holton's memorandum, is 6,895. Address Mrs. S. W. Holton, Everett, Mass.—A. GRAY.

(Mr. Holton also left in his library fourteen consecutive volumes of DeCandolle's Prodromus, which his widow would be glad to sell.—ED.)

DIGESTION IN PLANTS.—Dr. Lawson Tait has recently investigated afresh the Digestive Principles of plants. While he has obtained complete proof of a digestive process in *Cephalotus*, *Nepenthes*, *Dionæa*, and the *Droseraceæ*, he entirely failed with *Sarracenia* and *Darlingtonia*. The fluid separated from *Drosera binata* he found to contain two substances, to which he gives the names "droserin" and "azerin." Dr. Tait confirms Sir J. D. Hooker's statement that the fluid removed from the living pitcher of *Nepenthes* into a glass vessel does not digest. A series of experiments led him to the conclusion that the acid must resemble lactic acid, at least in its properties. The glands in the pitchers of *Nepenthes* he states to be quite analogous to the peptic follicles of the human stomach; and when the process of digestion is conducted with albumen, the products are exactly the same as when pepsine is engaged. The results give the same reactions with reagents, especially the characteristic violet with oxide of copper and potash, and there can be no doubt that they are peptones.—NATURE.

FLORIDIAN ALGÆ.—During my recent cruise among the Florida Keys nothing interested me so much as the Sea-weeds. Being familiar with the Algae of the Pacific and Atlantic coasts, I would hardly have believed that many of these belonged to that order, but for some previous acquaintance. Their resemblance to lichens, fungi, and corals is truly wonderful. Knowing the Reef Algae to be much sought for and almost unobtainable, I collected a large quantity of specimens aud had excellent success in preserving them. They have been identified by Prof. Farlow, our best authority on Marine Algae, and in December I shall have them ready for distribution, mounted in the best manner on card board 4½ by 6½ inches in size. They will be issued in three sets, each comprising two dozen species, at three dollars per set.—A. H. CURTISS.

THE ASTERS.—I wonder if other lovers of botany have with the Asters the same trouble I am compelled to contend with? The question may seem a foolish one, but as I have seen nothing in print on the subject of complaint, I wish some of the GAZETTE readers would give me, and perhaps others, the benefit of their experience.

Of all our wild flowers the Asters seem to me to be the most aggravating to the amateur. They are attractive and beautiful as they grow where nature strews them, but when the collector comes to name his treasures, their beauty and attractiveness are perhaps lost to him in the exhibition of a little temper, or may be in one or two bad words. I might complain of the cause of this, the variability of the plants, but that is not my chief stumbling-block, although they are sometimes rough when they should be smooth, or the leaves serrate when they ought to be entire, or the other way.

I have two hand books of botany; Gray's "New Lessons and Manual," and Alphonso Wood's "Class Book." They make "confusion worse confounded." On the color of the rays, the source of all my trouble, they neither agree between themselves, nor with the flowers as I find them. Here I do not rely upon my own judgment, but upon that of my sister, who is no botanist, but whose sense of color is very acute. As examples of their disagreement let me cite the following: Wood says of *Aster ericoides*, L., "pale purple flower;" Gray, "rays white." Of *A. longifolius*, Lam.. Gray says. "bright purplish-blue;" Wood, "light-blue rays." Of *A. lævis*, L., Gray says, "rays sky-blue;" Wood, "fine blue becoming purple." The list might be prolonged.

Now as to my great trouble. A specimen that I suppose to be *A. prenanthoides*, Muhl., according to the books has the "rays pale-blue." They do not seem so to me, and the question brings the reply, "light lavender." *A. cordifolius*, L. is described accurately, but with "rays pale blue" again. "What color do you call that?" is asked. "Light purple." *A. lævis*, has "rays sky-blue," says Gray. I ask my sister again, also two other persons. The three answers agree, "light-purple." If Job had studied the Asters would we not be without one of our favorite comparisons?

The reader may think that my specimens have not been correctly identified. I should think so, too, if, omitting the color and making allowances in this variable genus, the descriptions in the books did not agree so exactly with the plants themselves. Have others had the same trouble? Has any one seen a sky-blue Aster? I wish some one would rise and explain. and, as "misery loves company," that he would give us the benefit of his experience if he has suffered the same annoyance.—A. C. S., *Trenton, N. J.*

[The easiest way to dispose of this whole subject is to remember that color in flowers does not "count for much."—ED.]

DISTRIBUTION OF NYMPHACEÆ IN ARKANSAS.—While traveling through Arkansas this summer I noticed *Nelumbium luteum*, Willd. growing in ponds in Miller county on the Red River above and below

Fulton; in Pulaski county, east of Little Rock; in Pronie, Monroe and St. Francis counties, on the Memphis Railroad; in Conway, Crawford and Sebastian counties, on the Ft. Smith Railroad. It also occurs in Jefferson County, near Pine Bluffs; in Woodruff county, near Augusta, and about the headwaters of the Illinois River, north of Boston Mountains, in Washington county, northwest Arkansas.

*Nymphæa ordorata* grows in Saline, Jefferson and Hempstead counties, also with the former species in Washington county.

*Nuphar advena* is found so generally distributed through the State where I have been, I will not enumerate the localities.—F. W. HARVEY, *Ark. Ind. Univ., Fayetteville, Ark.*

CALLUNA VULGARIS IN NANTUCKET, MASS.—This species has been found in the station indicated, and the following note from a correspondent of Mrs. Owen, of Springfield, will describe the surroundings:

The soil around the *Calluna vulgaris* seemed to be quite good; that is, not so sandy as most of our soil is, though it was not near any pond, and very little, if any, lower than the ground in the vicinity. It was, perhaps, a mile from the beach, "as the crow flies," and not much more than a quarter of a mile from a human habitation. At first we thought there were several plants, but traced their connection with each other by pushing away a little of the soil, underneath which was a stalk an inch and a half or two inches in circumference. A bushel measure would nearly if not quite cover the whole. In the center of the plants the stalks appeared dead, being without foliage or blossoms, while on the outside the stalks were covered with foliage and dried blossoms mostly, with here and there a fresh one, and new foliage was springing from the ground among the dead stalks. This was the condition of the plant Oct. 14, 1880.—L. S. RIDDELL.

CHARACEAE OF AMERICA by *Timothy F. Allen, A. M., M. D.*, with colored illustrations from the original drawings by the author. Parts 1 and 2. S. E. Cassino, Boston.—The publication of this work was begun some time ago by Dr. Allen and a part or two being issued was discontinued. It has again been taken up by Cassino, who is gaining such an enviable reputation in the publication of scientific work, and is to be published in the same ornate way as the Ferns of North America. Each part consists of three colored plates and eight pages of text In the first two parts received the six plates illustrated the following species, *Chara Gymnopus, var. elegans, C. crinita, var. Americana, C. coronata, var. Schweinitzii, Nitella flexilis, vars. nidifica* and *crassa*, and *N. tenuissima*.

In the absence of any notice or advertisement we are unable to inform our readers anything with reference to frequency of issue and price. It is handsome enough to cost a round sum but we will guarantee that Cassino has put it low enough for any botanist to buy.

FORESTRY IN NORTH AMERICA.—In the last number or two of the *Gardener's Monthly* we have been reading a translation of a paper bearing the above title and written by John Booth, Klien Flottbeck, Germany. After considering the observed evil effects of forest destruction in various parts of the United States, the writer comes to the following rather somber conclusion, which may have more of truth in it than we will care to acknowledge:

"What then are the conclusions to be drawn from the above remarks for the future of North American Forestry?

"We have seen how all authority is wanting to enforce even the simplest regulations on forestry. The only man in America who ever undertook to carry out his absolute will in this, as every other respect, was Brigham Young, who in this one matter has our decided sympathy. The communistic theory that the "forests are the property of every single American," and that he has a perfect right to cut down as much timber as he needs, is so widespread; the corruption in official circles, an unavoidable consequence of perpetual rotation in office, is so general; the necessity in which both parties find themselves of not offending the mass of voters, is so great, that we can hardly call unjustified the assertions of competent and patriotic American authorities as to the impossibility of enforcing any protective laws on forestry. In view of such conditions we can neither hope for any beneficial results from the "Commission to inquire into the European Laws on Forestry," asked for by Mr. Secretary Schurz in his annual report to the President; nor expect Professor Sargent, of Harvard, to achieve much by the three years' survey of American forests, with which he has lately been entrusted. A more competent man, or a better authority on all incidental questions, could not be found; but of what use can laws be if there exist no authority to enforce them? It is to be feared that, unless affairs take some entirely unexpected turn, the words of the Secretary of the Interior for 1877 will come true—that "in twenty years at the most, the United States will no longer be able to fill the demands for home consumption for their own forests," and that they will have to import at an enormous outlay what they might have had at a trifling expense! What the consequences will be in other respects, we have already foreshadowed; it is impossible to overrate their importance."

SOME IMPURITIES OF DRINKING-WATER CAUSED BY VEGETABLE GROWTH, by Prof. W. G. Farlow, M. D.—This paper should have been noted before, but it was accidentally crowded out of the last number. It is extracted from a Report of the Massachusetts State Board of Health, etc., and contains two plates, illustrating eight plants. It is a pamphlet that should be in the hands of every one interested in water furnished by ponds or reservoirs. There are 22 pages of it, from which we cull out here and there a passage, although it is exceedingly difficult to select in such a fragmentary way from a paper that is so complete in itself that any omission seems like mutilation.—

"The object of the present paper is to present in a popular form a statement of what is known with regard to the effect of the growth of different plants upon the water in the ponds, streams, and basins which supply the cities and towns of the Commonwealth. In this connection the subject will be discussed from a botanical point of view; and we can only consider certain striking properties, such as smell and taste, with relation to the particular species of plants which produce them, without taking into account the more subtle changes which can only be detected by chemical analysis. It is desirable that all who, in any sense, have charge of the public health, should have some familiarity with the common forms of plants, likely to pollute drinking-water; because, as the matter now stands, the public are at the mercy of any person, who, armed with a compound microscope and a supply of Latin and Greek names, chooses to alarm the neighborhood by the announcement of the appearance in the water-supplies of plants whose injurious nature is supposed to be in direct proportion to the length and incomprehensibility of their names. The public are now beginning to read about the germ-theory of disease; and hearing that fevers may be produced by germs, and being told that germs are found in water, they very naturally but illogically infer that any small bodies found in the water are the germs of disease. Whatever of truth there may be in the germ-theory of disease, there is no doubt that designing persons impose on the credulity and fears of the public by representing as germs of disease microscopic plants which could not possibly have caused any of the diseases which have been supposed by scientific men to be produced by germs of a vegetable nature."

After speaking of the higher water-plants, such as *Myriophyllum*, *Anacharis* and *Potamogeton*, the writer proceeds to consider the algæ.

"Whatever their shape may be, we may, in considering the effect which they produce, divide the algæ into two groups: those which are grass-green or yellowish-green, and those which are bluish-green or purplish."

"Considered from a sanitary point of view, we may say that the grass-green algæ have no injurious effect upon the water in which they grow On the contrary, we may regard their presence as an indication of its purity, for they do not grow in impure water. If almost any river or pond water, no matter how clear it appears, is placed in a covered glass jar, in a few days or weeks there will be formed a greenish expansion on the sides and at the bottom, which, on examination will be found to consist principally of the young stages of development of some of the algæ which we have already described."

"We may next pass to a consideration of those algæ which have a bluish-green color. The color is of importance, because by its means, any person of ordinary intelligence can distinguish the present group of algæ from those already described; and while, as we saw, the latter are quite harmless, it is to the presence and decay of the former that we are able to ascribe the cause of some of the most decidedly disagreeable odors and tastes found in drinking water."

The characteristic odor given off in decay is aptly described as a pig-pen odor.

"Looking to the future, one may assert that no absolute remedy can be proposed in case of the ponds already affected. They should be cleared of weeds and substances in which the *Nostocs* may lodge; and, where it is possible to regulate the height of the water, it should not be allowed to fall rapidly in the hot weather. Large and deep bodies of water are less likely to be affected than small and shallow bodies, and gravelly bottoms are better than muddy. The escape of steam or hot water should never be turned into ditches or streams connecting directly with water supplies. When such is the case, there is a most luxuriant growth of species of the *Nostoc* family, and the water becomes very foul."

"In one respect, the fears of the public may be set at rest. The theory that certain diseases, as fevers, are produced by germs of some low forms of plant-life, whether true or not, has no bearing on the present case. On the one hand, although we know that the species described in the present article do cause the disagreeable pig-pen odor, and do render the water at times unfit to drink, we know, on the other hand, that they do not cause the specific diseases whose origin is considered to be explained by the germ theory. The germs, so called, are all species of bacteria, distinct from the *Nostoc* family and much smaller."

"From a botanical point of view, the floating *Nostocs* are very interesting; but it is usually difficult to get good material for study unless one is on the spot. The species of *Anabæna* are especially prone to break up and decompose when sent by express, and the various preservative fluids are of little use. To determine the species one should have the spores and heterocysts in position. The best way of preparing specimens is, by means of a pipette, to drop some of the water containing the plants upon a piece of mica or glass, and let it dry. The specimens can then be sent any distance; and, on re-moistening, the plants swell up so that they can be well studied. If they do not at once recover their form, a little ammonia or potash may be added. Information about the winter condition of the vegetation is very much wanted; and especially do we need an accurate chemical knowledge of their relation to the water in which they grow."

DESTRUCTION OF OBNOXIOUS INSECTS BY MEANS OF FUNGOID GROWTHS. By Prof. A. N. Prentiss.—This pamphlet is devoted to the detailing of experiments to test the proposition that certain obnoxious insects can be destroyed by the application of the Yeast Fungus. The result seems to be that yeast cannot be depended upon to rid our house plants of the insects that commonly infest them. Of course Prof. Prentiss does not claim that his experiments decide the whole general question, for yeast may be efficient in the destruction of other obnoxious insects, or some other fungus may be used as a remedy where yeast will not act.